

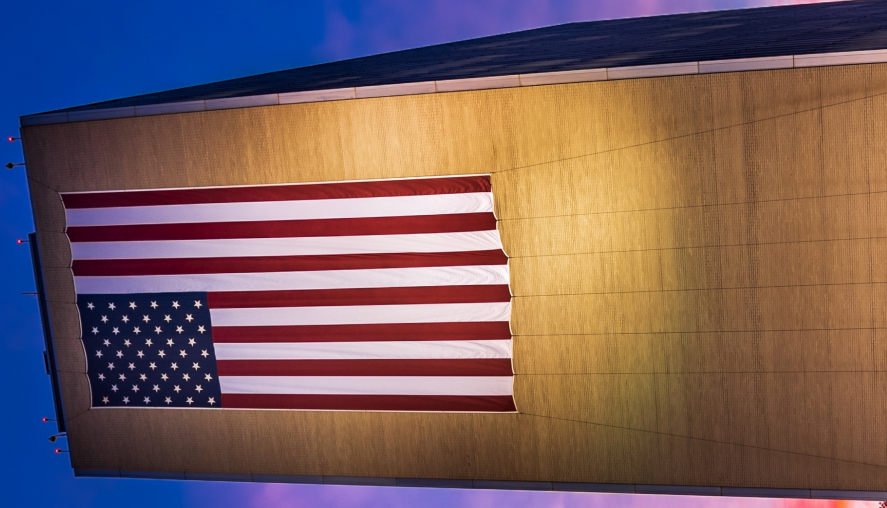
NIST Standardization Efforts and how they Underpin the United States Innovation Infrastructure

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National Institute of Standards and Technology

NIST Mission

To promote U.S. innovation and
industrial competitiveness
by advancing measurement
science, standards, and
technology in ways that enhance
economic security and improve
_____our quality of life_____



- 1. Accelerate Innovation in Critical and Emerging Technologies of the Future** Buildout and scale-up of the U.S. quantum industrial base, solidify American dominance in AI innovation, harness the power of biotechnology, and grow U.S. leadership in semiconductors.
- 2. Bolster American Leadership in Standards**

U.S. engagement and leadership in international standards for critical and emerging technologies (CETs) to promote U.S. trade, and standards policy coordination across the U.S. government.
- 3. Accelerate the Commercial Adoption of U.S. Innovations**

Adoption and commercialization of federally funded scientific discoveries and technology advancements in CETs at the pace of industry.
- 4. Build 21st Century Research Infrastructure to Unleash CET Innovation** Construct world-class facility infrastructure and equip NIST with the required laboratory environments to drive innovation in Gaithersburg, MD, and

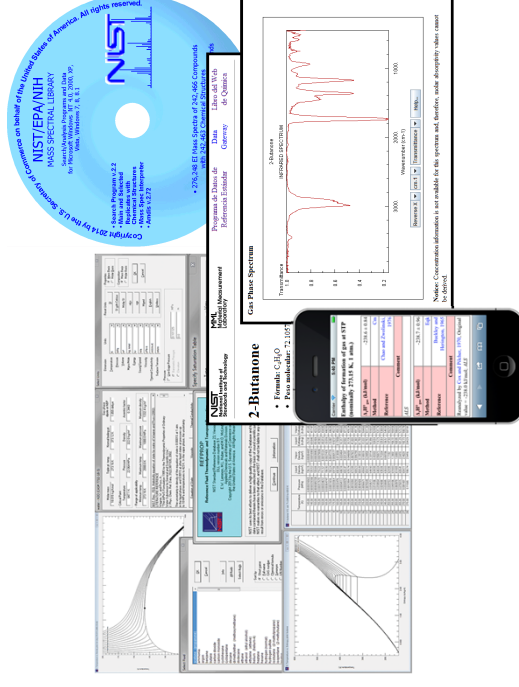
NIST Products and Services

Measurement research

- ≈ 2,200 publications per year

Standard Reference Data (SRD)

- ≈ 100 different types
- ≈ 6,000 units sold per year
- ≈ 226 million data downloads per year



Standard Reference Materials (SRMs)

- ≈ 1,100 products available
- ≈ 30,000 units sold per year

Calibration tests

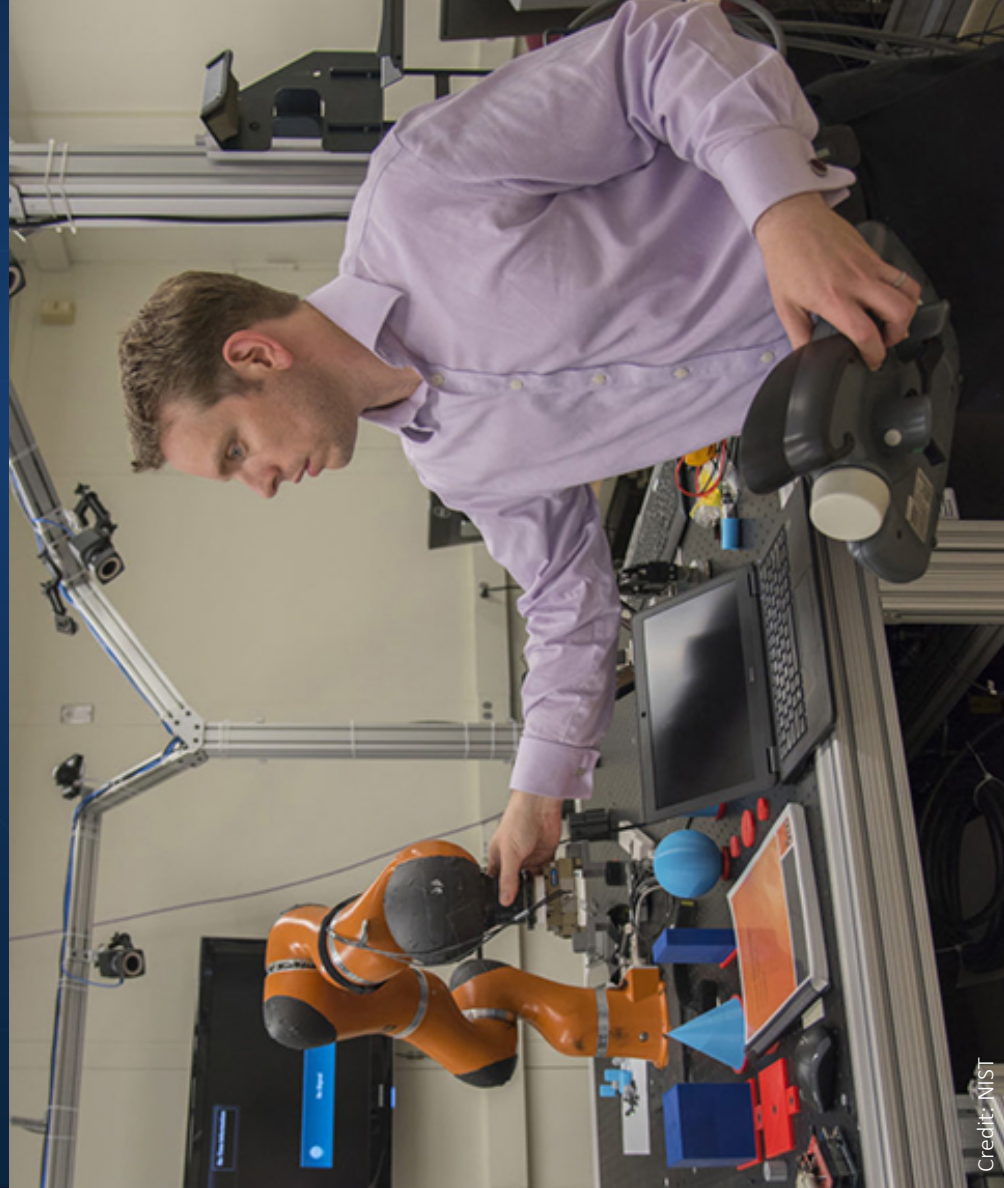
- ≈ 18,000 tests per year

Laboratory accreditation

- ≈ 800 accreditations of testing and calibrations laboratories per year

Documentary Standards Role

NIST



Credit: NIST

Important Role

440+ NIST technical staff in
1,669+ standard committees with
210+ NIST technical staff serving in
leadership positions in
105+ standards development
organizations

NIST's technical expertise results in improved standards and U.S. competitiveness

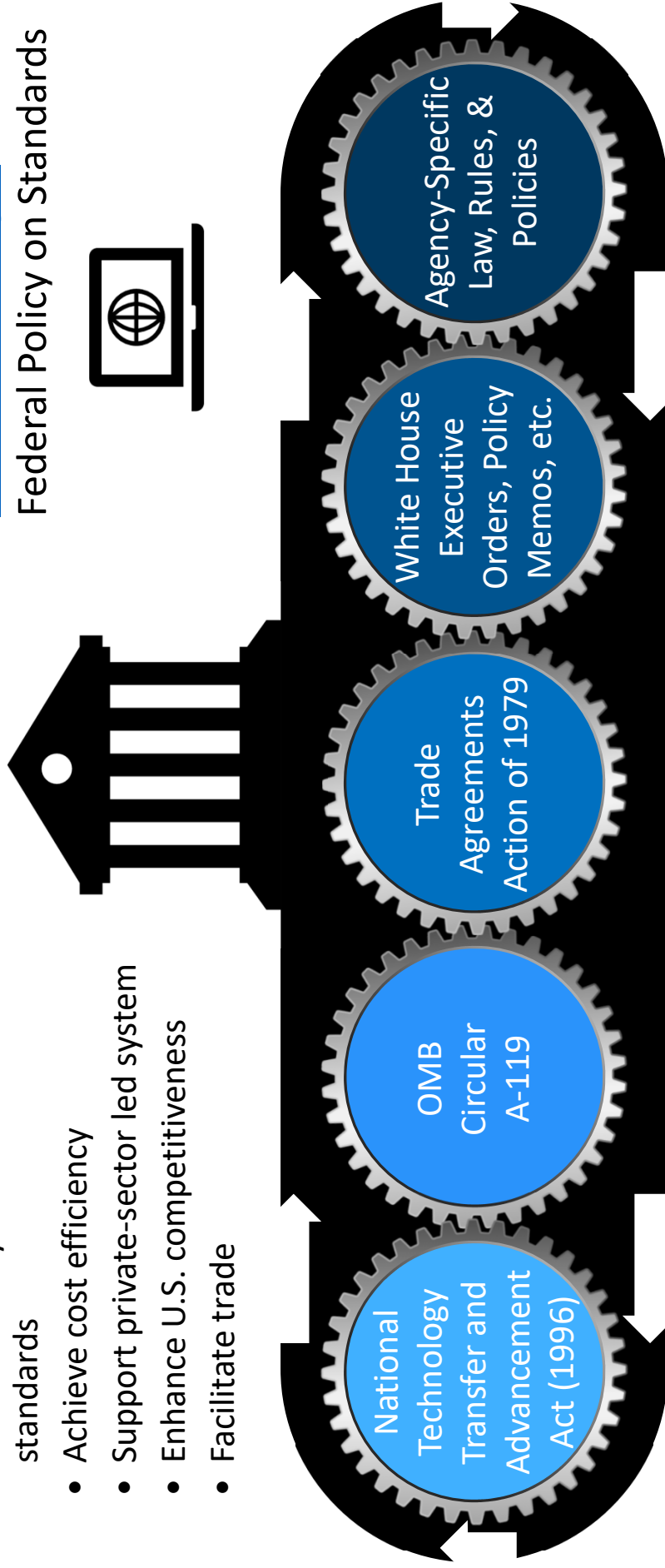
Legal Policy and Framework

Objectives:

- Produce timely and effective standards
- Achieve cost efficiency
- Support private-sector led system
- Enhance U.S. competitiveness
- Facilitate trade

www.standards.gov ->

Federal Policy on Standards



The NTTAA



What is it?

National Technology
Transfer Advancement Act
(NTTAA)

Enacted in 1996, amended
in 2001

Directs federal agencies
with respect to their use
of voluntary consensus
standards and conformity
assessment practices

Why?

Minimize reliance on
government-unique
standards

Agency Responsibilities?

Use existing voluntary
consensus standards in
regulation where possible

Report annually to
Congress on standards
activities

OMB Circular A-119

NIST

What is it?

Guidance on how to implement the NTTAA

Q&A Format

Last revised in 2016

What does it say?

Defines “voluntary consensus standards” and outlines criteria

Encourages agency participation in standards development

Selecting conformity assessment methods and programs

What is the impact?

Reduced reliance on government unique standards

Promotes efficiency and consistency in federal regulations

Reduces barriers to international trade

Interagency Committee on Standards Policy **NIST**

ICSP Working Groups:



**Advanced
Communication**



Artificial Intelligence



Conformity Assessment



**Semiconductors and
Microelectronics**



Agency Impacts

- Education on Various SDOs
- Accessing Standards for Review and Purchase
- Overcoming Incorporation by Reference Challenges
- Opportunities for Participation in ISO/IEC Standards Activities

International Standardization in ISO & IEC



Biotechnology (MML)

ISO/TC276 Biotechnology + 6 WGs
US TAG to ISO/TC276 Biotechnology
ISO/TC276/SC1 Analytical methods + 3 WGs
US TAG to ISO/TC276/SC1 Analytical methods
ISO/TC212/WG6 Quality practice for
detection of SARS-CoV-2



Quantum Technology (PML / ITL)

ISO/IEC/JTC1/WG14 Quantum information
technologies
INCITS Quantum Information Technologies TC
ISO/IEC/JTC-3 Quantum technology
US TAG to ISO/IEC/JTC-3 Quantum technology



Artificial Intelligence (ITL)

IEC/ISO JTC 1 SC 42 Artificial Intelligence
US TAG to IEC/ISO/JTC1/SC 42



Other Consultative Events

ISO/TC298 Rare earth
ISO/TC333 Lithium
ISO/TC12 Quantities and units
ISO/TC334 Reference materials
ISO TC272 Forensic Sciences

NIST Emerging Technology Standards Engagement Program



The Standards Coordination Office (SCO) allocated approximately \$4.1 million, more than our original \$3.0 million allocation. The eleven cross-OU collaborative proposals selected for funding:

Advancing Metrology to Support U.S. EVSE Infrastructure : International Interlaboratory Study to Establish DC Electricity Calibration Capabilities
Reducing US Dependence on Critical Mineral Cobalt Through Cobalt-Free Maraging Steels
Expanding the Scope of ISO 20391: Biotechnology Cell Counting Standards Series to Support Microbial Cell Enumeration
Quantum Photonic s Standards Development
Assuring Leadership in International Standards Development for Biotechnology
Building NIST Measurement Assurance Strategies into Ongoing ISO Cell Viability
Radiocarbon Measurement Science to Underpin Reliable Carbon Markets
Support for NIST Engagement in International AI Standards-Setting Processes
Reinvigoration of Reference Nanomaterial Production Capabilities for International Standard Support
Standards and Performance Metrics for Automated Vehicle Lidars
A Framework and Platform for Uncertainty Quantification of Absolute Particle Count

NIST piloted the NIST Emerging Technologies Standards Engagement (NETSE) Program to fund proposals from NIST laboratory teams that will significantly strengthen and accelerate international standards engagement in critical and emerging technologies (CETs) essential to U.S. economic competitiveness and national security.

Strategic Standards Information Service (SSIS) Database

The SSIS Database is a web-based application designed to strengthen U.S. Government awareness and participation in global critical and emerging technology standards by harvesting, augmenting, and analyzing national and international standardization activities.

The application:

- provides end users with a fully searchable catalog of pre-standard work items
- provides back issues of complete newsletters
- data is exportable
- future enhancements will include trend analysis and charts

Standardization news records are aggregated and formatted as newsletters; users can subscribe to the three core products:

- *U.S. and International Standardization News* (biweekly)
- *China Standardization News* (biweekly)
- *International Standardization Alerts* (ad hoc basis)



Includes select international technical committees for the following

Standards Developing Organizations (SDO):

- International Electronic Commission (IEC),
- International Organization for Standardization (ISO),
- ISO/IEC Joint Technical Committee (JTC) 1, and
- International Telecommunication Union Telecommunication Standardization Sector (ITU-T).

This application is also designed for the SSIS Program Staff to conduct advanced analysis on standards trends and identify threats. The tool tracks key standards developing bodies, their leadership, their behavior, and their structure as well as Chinese standardization efforts across the world.

Contact Us



ssis@nist.gov

U.S. Government Interagency Standards Portal

The NIST Standards Coordination Office's Strategic Standards Information Service (SSIS) is launching a new collaborative website for government personnel

The Portal contains a collection of resources and services for standardization stakeholders. Users can share and access experiences, tools, lessons learned, and ways of addressing standardization management. The Portal contains two main applications:

The U.S. Government Standardization Document Catalog

- A repository of standards-related documents developed by offices across the interagency
- Includes best practices, landscapes, guides, presentations, external reports, and more
- Fully searchable
- Allows users to upload and share documents through a widget mechanism



The U.S. Government Standards Participation Tracking Database

- A repository of participation records by government employees across SDOs
- Populated by Agency submissions that are cleaned, aggregated, and organized
- The application is interactive
- A widget mechanism exists to allow non-participating agency personnel to input their own SDO committee participation

- Widgets to upload shared resources
- Information on upcoming events
- Interactive dashboards on standards participation
- Dynamic graphics and summary statistics
- Answers to frequently asked standards questions

Get Access

The Portal is built on NIST's Internal SharePoint platform. New users are welcomed and encouraged. The SSIS program manages access to the Portal through SharePoint. New users need to ask to be added to the Portal user group by emailing ssis@nist.gov and then follow a short set of instructions to authenticate and log in for the first time. A step-by-step guide is available.

Contact



ssis@nist.gov

Standardization Readiness Context: Innovation Product Continuum

Standards are a Means to an
End...

Research / Metrology

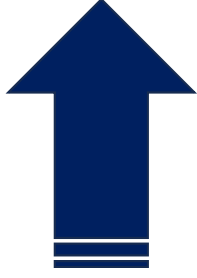
Demonstration & Scale-up

Product Development

Manufacturing & Commercialization

Adoption / Market and Community Needs

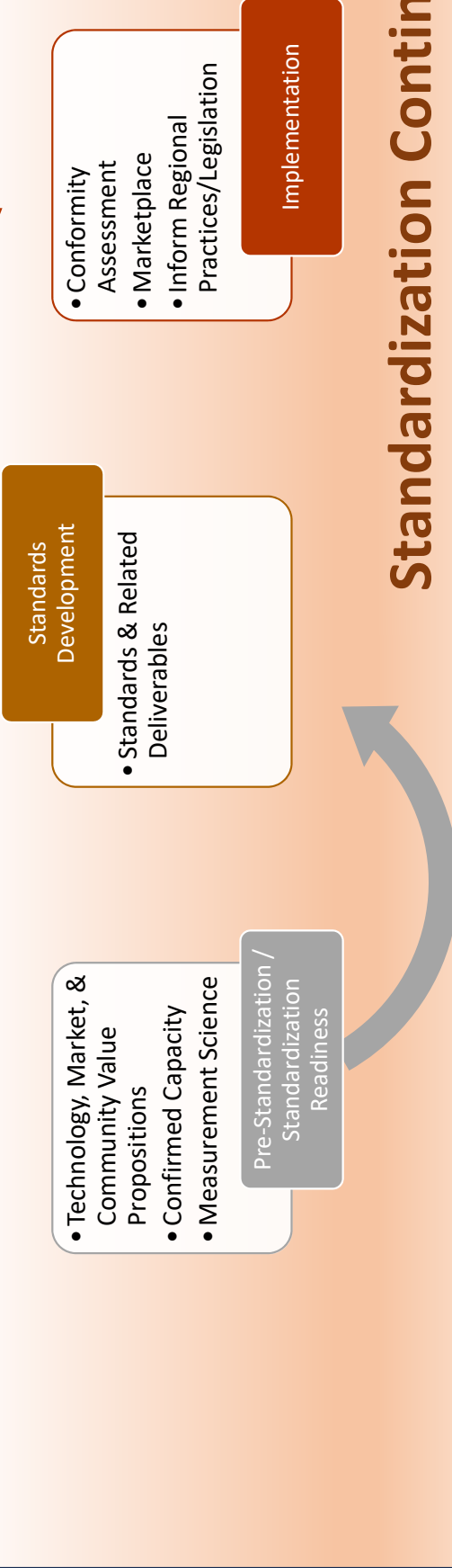
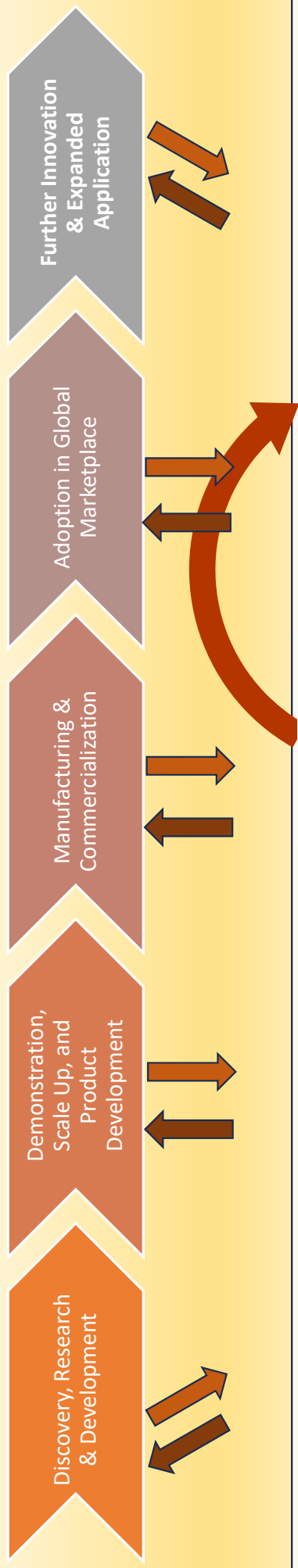
Broaden Applications / Further Innovate



Putting Standardization Readiness into Context: Insertion Points

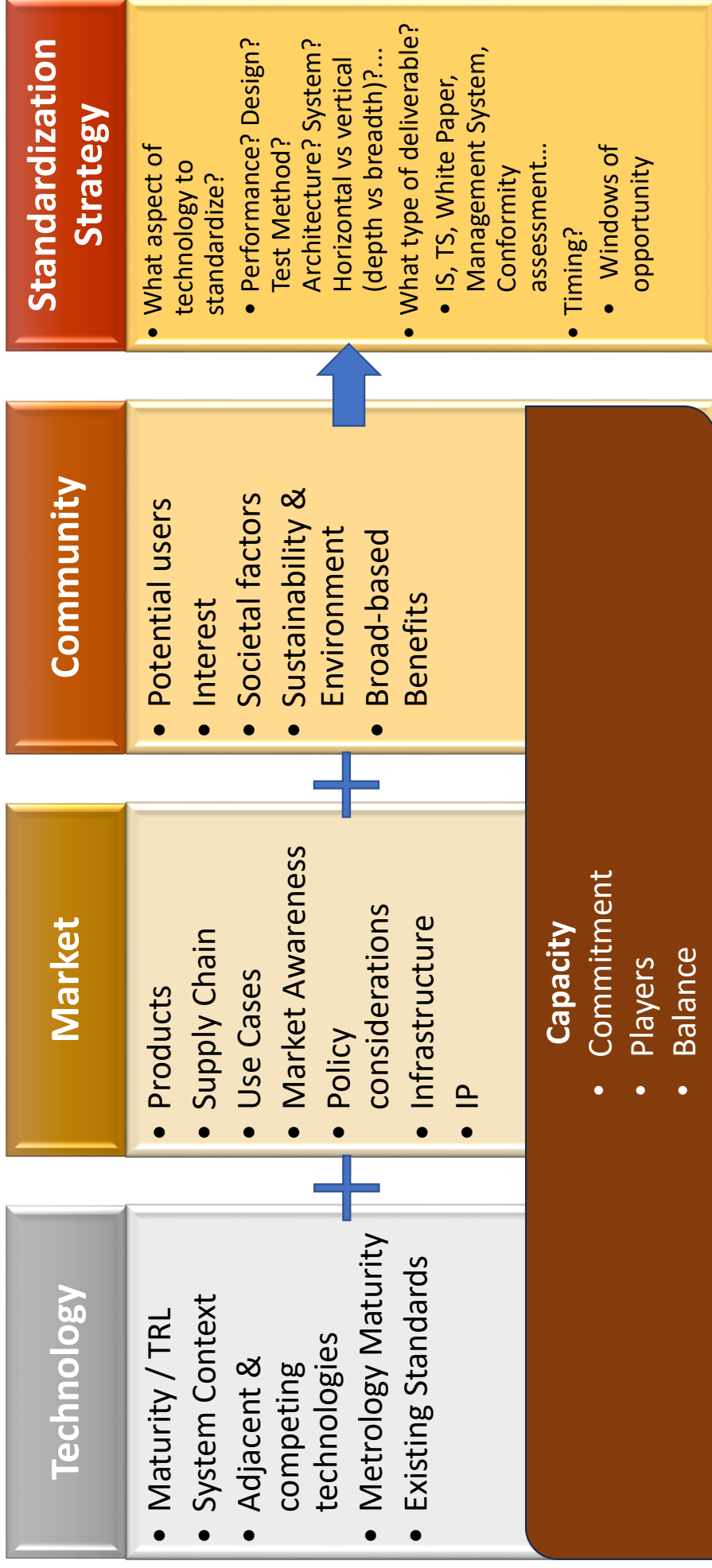
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Technology Development Continuum



Standardization Continuum

SR Dimensions Inform a Standardization Strategy



Thank you



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NIST

STANDARDS
COORDINATION
OFFICE

www.Standards.gov

Evaluate Value Propositions of each Element NIST

Technology Value Proposition

- Sufficiently mature for the type of standard or related deliverable being recommended?
- Relationship between technology characteristics and “performance” sufficiently understood? Metrology needs?
- Impact of standards development on future technology innovation or standards?

Market Value Proposition

- Sufficient business case to justify the pursuit of a standard?
- Provision for equitable access to the global marketplace, while stimulating innovation?

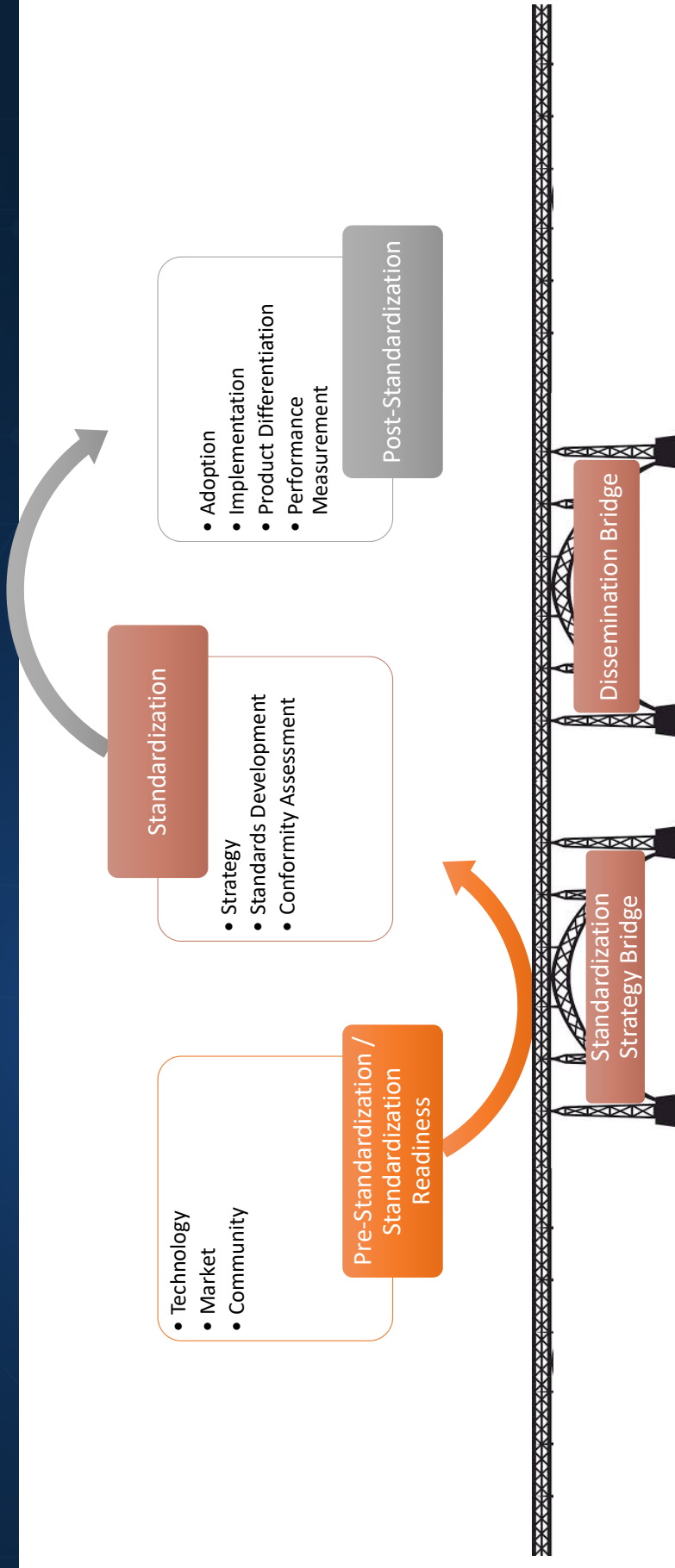
Community Value Proposition

- Stakeholder interests sufficiently understood?
- Evidence that standards are both needed and wanted?

Capacity Value Proposition

- Global (or regional) expertise that is collectively balanced, committed, and reflective of all elements and competencies needed to develop the standard?

Standardization Continuum



NTTAA Has Been Effective



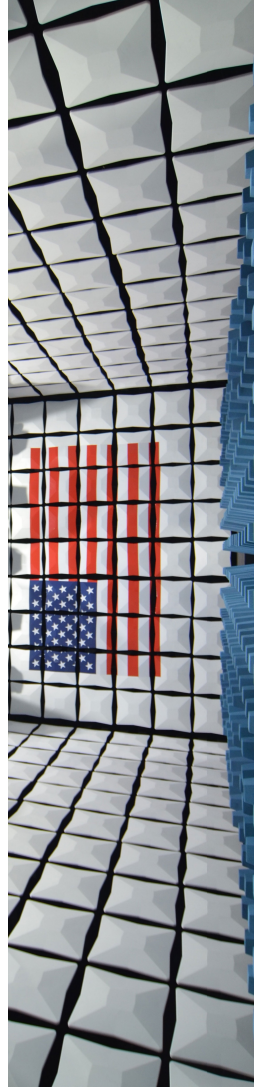
Since reporting began in 1997:

- Over **3,500** private sector standards have replaced Government-unique standards
- Over **90** Government-unique standards have been reported
- Only **81** government standards remain in lieu of private sector standards under the NTTAA



Emerging Technologies

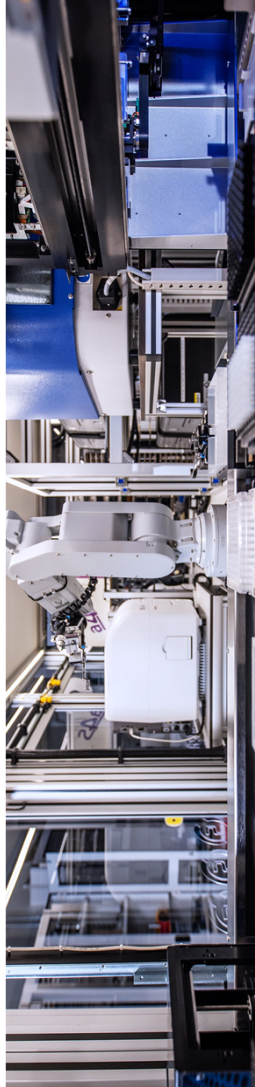
NIST



Credit: NIST

Next Generation Communications

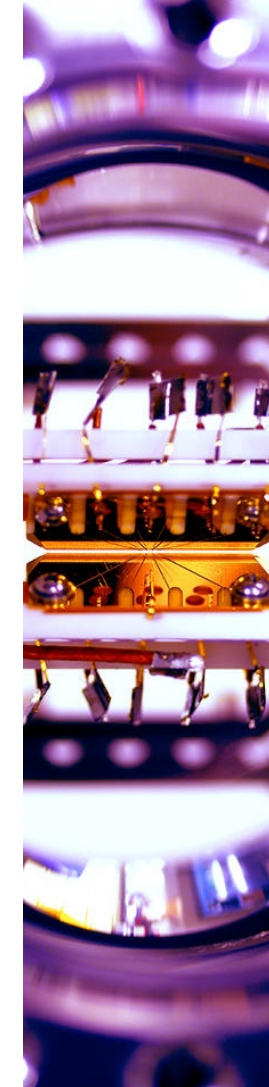
Advancing 6G and innovation in wireless networking, and modernizing the U.S. public safety communications infrastructure



Credit: NIST

Biotechnology

Enabling emerging biotechnology and biomanufacturing innovation to drive growth of the U.S. bioeconomy



Credit: NIST

Quantum Information Science & Tech

Leading research in quantum science to drive commercialization of quantum systems for U.S. industry



Semiconductor Manufacturing and
Advanced Research with Twins **USA**

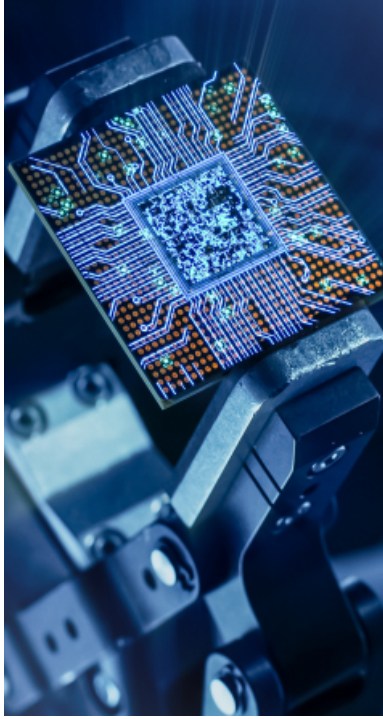
Semiconductor Research Corporation

Semiconductor Manufacturing and Advanced Research with Twins USA (SMART USA)

Awarded \$285 million to focus on efforts to more rapidly develop, validate, and use digital twins to improve domestic semiconductor design, manufacturing, advanced packaging, assembly, and test processes.

CHIPS Metrology Program

Emphasizes measurements that are accurate, precise, and fit-for-purpose for the production of microelectronic materials, devices, circuits, and systems. This work leverages NIST's proven measurement science expertise, foundational communications and computing research capabilities, standards development contributions, and stakeholder engagement practices.



Artificial Intelligence

NIST

Improving AI **trustworthiness**

Supporting AI **adoption across U.S. industries**

Driving **innovation** and development of new products

Center for AI
Standards
and
Innovation

Information
Technology
Lab

AI for Resilient
Manufacturing
Institute
Competition

Credit: NIST

